

AES-100

ADSL-Ethernet Switch

August 2001

User' s Guide

ZyXEL
TOTAL INTERNET ACCESS SOLUTION

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- (2) This device must accept any interference received, including interference that may cause undesired operations.

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Note

CE and FCC Certifications

For more information about your modem's Declaration of Conformity (DOC) please refer to www.zyxel.com.

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If you have questions about your ZyXEL product or desire assistance, contact ZyXEL Communications Corporation offices worldwide, in one of the following ways:

Contacting Customer Support

When you contact your customer support representative, have the following information ready:

- ◆ Product model and serial number.
- ◆ Firmware version information.
- ◆ Warranty information.
- ◆ Date you received your product.
- ◆ Brief description of the problem and the steps you took to solve it.

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Table of Contents

| | |
|---|------------|
| Copyright | ii |
| ZyXEL Limited Warranty..... | iii |
| Interference Statements and Warnings | iv |
| Customer Support | v |
| List of Figures..... | x |
| List of Tables..... | x |
| Preface..... | xii |
| Chapter 1 Getting to Know the AES-100..... | 1-1 |
| 1.1 Features | 1-1 |
| 1.2 Benefits..... | 1-3 |
| 1.2.1 MTU Application | 1-3 |
| 1.2.2 ISP Application | 1-4 |
| 1.2.3 Compact Design for Limited Space..... | 1-4 |
| 1.2.4 Scalable Platform for Future Expansion..... | 1-4 |
| 1.3 Physical Specifications | 1-4 |
| Chapter 2 Hardware Overview..... | 2-1 |
| 2.1 Unpacking the AES-100..... | 2-1 |
| 2.2 Additional Installation Requirements..... | 2-1 |
| 2.3 Front Panel..... | 2-1 |
| 2.3.1 Front Panel Ports..... | 2-2 |
| 2.3.2 Front Panel LEDs..... | 2-2 |
| 2.4 Console Port | 2-2 |
| 2.5 ADSL Port Connections | 2-3 |
| 2.6 Rear Panel | 2-3 |
| Chapter 3 Software Configuration..... | 3-1 |
| 3.1 Command Line Interface..... | 3-1 |
| 3.2 Console Connection | 3-1 |
| 3.3 Command Structure | 3-2 |
| 3.3.1 Help Facility..... | 3-2 |
| 3.4 System Commands | 3-2 |

| | | |
|------------------|--|------------|
| 3.4.1 | Uptime Command | 3-2 |
| 3.4.2 | Version Command | 3-2 |
| 3.4.3 | Restart Command..... | 3-3 |
| 3.4.4 | Passwd Command..... | 3-3 |
| 3.4.5 | Config Print Command..... | 3-3 |
| 3.4.6 | Config Save Command..... | 3-3 |
| 3.4.7 | Exit Command | 3-3 |
| Chapter 4 | ADSL Configuration..... | 4-1 |
| 4.1 | ADSL Standards..... | 4-1 |
| 4.2 | Configured Vs. Actual Speed..... | 4-1 |
| 4.3 | Default Settings | 4-1 |
| 4.4 | ADSL Commands | 4-2 |
| 4.4.1 | Config Save Command..... | 4-2 |
| 4.4.2 | Disable Port Command..... | 4-2 |
| 4.4.3 | Disable Ports Command | 4-2 |
| 4.4.4 | Enable Port Command..... | 4-3 |
| 4.4.5 | Enable Ports Command | 4-3 |
| 4.4.6 | Linedata Command..... | 4-3 |
| 4.4.7 | Lineinfo Command | 4-4 |
| 4.4.8 | Lineperf Command | 4-5 |
| 4.4.9 | Linerate Command..... | 4-6 |
| 4.4.10 | List Port Command | 4-6 |
| 4.4.11 | List Ports Command | 4-7 |
| 4.4.12 | Set Port Command | 4-7 |
| 4.4.13 | Set Ports Command..... | 4-7 |
| 4.4.14 | Show Port Command..... | 4-8 |
| 4.4.15 | Show Ports Command..... | 4-8 |
| Chapter 5 | 10 Mbps Ethernet Port Configuration | 5-1 |
| 5.1 | 10 Mbps Ethernet | 5-1 |
| 5.2 | Default Settings..... | 5-1 |
| 5.3 | Ethernet Commands | 5-1 |
| 5.3.1 | Set Duplex Command..... | 5-1 |

| | | |
|------------------|--|------------|
| 5.3.2 | Status Command..... | 5-1 |
| Chapter 6 | Bridge Configuration..... | 6-1 |
| 6.1 | Bridge Port Numbers | 6-1 |
| 6.2 | Port-Based VLAN..... | 6-1 |
| 6.2.1 | Default Settings of Port-Based VLAN..... | 6-1 |
| 6.3 | Bridge Commands..... | 6-2 |
| 6.3.1 | Device Command | 6-2 |
| 6.3.2 | Filter Command..... | 6-2 |
| 6.3.3 | Filterage Command..... | 6-2 |
| 6.3.4 | Flush Command..... | 6-3 |
| 6.3.5 | Info Command | 6-3 |
| 6.3.6 | Status Command..... | 6-3 |
| 6.4 | Port-Based VLAN Commands..... | 6-3 |
| 6.4.1 | Portfilter Command | 6-3 |
| Chapter 7 | IP Configuration | 7-1 |
| 7.1 | Setting the IP Address..... | 7-1 |
| 7.2 | General IP Commands | 7-2 |
| 7.2.1 | Config Command | 7-2 |
| 7.2.2 | Ping Command | 7-3 |
| 7.2.3 | Statistics Command | 7-3 |
| 7.2.4 | Version Command | 7-3 |
| Chapter 8 | Remote Management..... | 8-1 |
| 8.1 | Management by Telnet..... | 8-1 |
| 8.2 | SNMP Management | 8-1 |
| 8.2.1 | Supported MIBs..... | 8-2 |
| 8.3 | SNMP Access Configuration | 8-2 |
| 8.3.1 | SNMP Access Read/Write Command..... | 8-2 |
| 8.3.2 | SNMP Access Delete command..... | 8-3 |
| 8.3.3 | SNMP Access Flush Command | 8-3 |
| 8.3.4 | SNMP Access List Command..... | 8-3 |
| 8.4 | SNMP Trap Configuration | 8-3 |
| 8.4.1 | Supported Traps..... | 8-3 |

| | | |
|-------------------|--|-------------|
| 8.4.2 | Trap Add Command..... | 8-5 |
| 8.4.3 | Trap Delete Command..... | 8-5 |
| 8.4.4 | Trap Flush Command..... | 8-5 |
| 8.4.5 | Trap List Command | 8-5 |
| Chapter 9 | Configuration Backup/Restore..... | 9-1 |
| 9.1 | Configuration Files of the AES-100 | 9-1 |
| 9.2 | Control Files Used In TFTP Operation | 9-1 |
| 9.3 | Configuration Backup | 9-2 |
| 9.4 | Configuration Restore..... | 9-2 |
| Chapter 10 | Firmware Upload | 10-1 |
| 10.1 | BOOTP/TFTP Firmware Update of the AES-100..... | 10-1 |
| 10.2 | TFTP Firmware Update on the AES-100 | 10-5 |
| Chapter 11 | Troubleshooting | 11-1 |
| 11.1 | ADSL LED(s)..... | 11-1 |
| 11.2 | Data Transmission..... | 11-1 |
| 11.3 | ADSL LED(s) turn On and Off..... | 11-2 |
| 11.4 | Data Rate..... | 11-2 |
| 11.5 | Configured Settings | 11-2 |
| 11.6 | Password | 11-3 |
| 11.7 | Remote Server | 11-3 |
| 11.8 | SNMP | 11-3 |
| 11.9 | Telnet..... | 11-4 |
| Index..... | | A |

List of Figures

| | |
|--|------|
| Figure 1-1 MTU Application..... | 1-3 |
| Figure 1-2 ISP Application..... | 1-4 |
| Figure 2-1 AES-100 Front Panel | 2-2 |
| Figure 2-2 AES-100 Rear Panel AC Power Version | 2-3 |
| Figure 2-3 AES-100 Rear Panel DC Power Version | 2-3 |
| Figure 2-4 Connecting the Power Cord to the AES -100 and a Power Source..... | 2-4 |
| Figure 6-1 Default VLAN Settings | 6-2 |
| Figure 6-2 Example of Modified VLAN Port 1 | 6-5 |
| Figure 6-3 Example of Modified VLAN Port 2..... | 6-5 |
| Figure 6-4 Example of Modified VLAN Port 3..... | 6-6 |
| Figure 6-5 Example of Modified VLAN Settings | 6-6 |
| Figure 7-1 Setting IP Address and Default Gateway | 7-2 |
| Figure 8-1 SNMP Management Model | 8-2 |
| Figure 10-1 BOOTP/TFTP Server | 10-2 |
| Figure 10-2 Input MAC..... | 10-3 |
| Figure 10-3 Database Edit Dialog | 10-4 |
| Figure 10-4 Enable BOOTP/TFTP..... | 10-4 |
| Figure 10-5 Enter Debug Mode | 10-4 |

List of Tables

| | |
|---|------|
| Table 2-1 Front Panel Ports of an ADSL Network Module..... | 2-2 |
| Table 2-2 AES-100 Network Module LED Descriptions | 2-2 |
| Table 4-1 ADSL Standards..... | 4-1 |
| Table 11-1 Troubleshooting the ADSL LED(s) | 11-1 |
| Table 11-2 Troubleshooting Data Transmission..... | 11-1 |
| Table 11-3 Troubleshooting a Non-Constant ADSL LED | 11-2 |
| Table 11-4 Troubleshooting the SYNC -rate | 11-2 |
| Table 11-5 Troubleshooting the AES -100' s Configured Settings..... | 11-2 |
| Table 11-6 Troubleshooting the Password | 11-3 |
| Table 11-7 Troubleshooting a Remote Server | 11-3 |

| | |
|--|------|
| Table 11-8 Troubleshooting the SNMP Server | 11-3 |
| Table 11-9 Troubleshooting Telnet..... | 11-4 |

Preface

Congratulations on your purchase of the AES-100 ADSL-Ethernet Switch.

This preface introduces you to the AES-100 and discusses the organization and conventions of this user' s guide. It also provides information on other related documentation.

About the AES-100

The AES-100 is an ADSL (Asymmetrical Digital Subscriber Line) to Ethernet switch. It allows you to multiplex traffic from up to 16 ADSL lines to an Ethernet network before it is forwarded to the Internet.

General Syntax Conventions

“Enter” means for you to type one or more characters and press the carriage return. “Select” or “Choose” means for you to select one from the predefined choices.

For brevity' s sake, we will use “e.g.” as shorthand for “for instance”, and “i.e.” as shorthand for “that is” or “in other words” throughout this manual.

Related Documentation

Support Notes

More detailed information about the AES-100 and examples of its use can be found in the Support Notes accessible through the ZyXEL web pages at www.zyxel.com.

ZyXEL Web Page and FTP Server Site

You can access release notes as well as firmware upgrades at ZyXEL web and FTP sites. Refer to the Customer Support page for more information.

Chapter 1

Getting to Know the AES-100

This chapter describes the key features, benefits and applications of your AES-100.

The AES-100 is an ADSL (Asymmetrical Digital Subscriber Line) to Ethernet switch. It aggregates traffic from up to 16 ADSL lines to Ethernet.

ADSL allows the coexistence of broadband data service and conventional voice service over the same telephone wire. When deployed together with ZyXEL's ADSL modems, e.g., P642M, and WAN routers, e.g., P1400, the combination forms an integrated solution for providing broadband services to multiple tenant units such as apartments, hotels, offices and campus buildings.

1.1 Features

Two-Slot Chassis

The AES-100 has two slots for the ADSL to Ethernet multiplexer modules. This design provides the flexibility for you to install as few as a single module for the initial deployment and yet still has room to grow as demand increases.

8-Port ADSL to Ethernet Multiplexer Modules

Each ADSL to Ethernet multiplexer module aggregates traffic from 8 lines to an Ethernet port.

Integrated Splitters

The integrated splitters eliminate the need to use external splitters to separate voice-band and ADSL signals.

10 Mbps Ethernet Port

This 10 Mbps Ethernet port connects the AES-100 to an Ethernet network. With Ethernet as the backbone, you can create a network that provides ADSL service to hundreds of subscribers.

ADSL Compliance

- Multi-Mode ADSL standard
 - G.DMT (ITU G.992.1)
 - G.Lite (ITU G.992.2)
 - G.hs (ITU G.994.1)
- Rate adaptation support

Bridging

- IEEE 802.1d transparent bridging

- Up to 4096 MAC entries address table

Protocol

- Multiple Protocols over AAL5 (RFC 1483)

Management

- Remote configuration backup/restore and firmware upgrade
- SNMP manageable
- Text-based management locally via console port and remotely via telnet
- TFTP (Trivial File Transfer Protocol) for transferring firmware and configuration files

Security

- Password protection for system management
- Port-based VLAN

1.2 Benefits

1.2.1 MTU Application

The following diagram depicts a typical application of the AES-100 in a large residential building, or multiple tenant unit (MTU), that leverages the existing phone line wiring to provide Internet access to all tenants.

A tenant connects a computer to the phone line in a unit using an ADSL modem. The other end of the phone line is connected to a port on the AES-100. The AES-100 aggregates the traffic from the tenants to the Ethernet port and forwards it to a router. The router then routes the traffic further to the Internet.

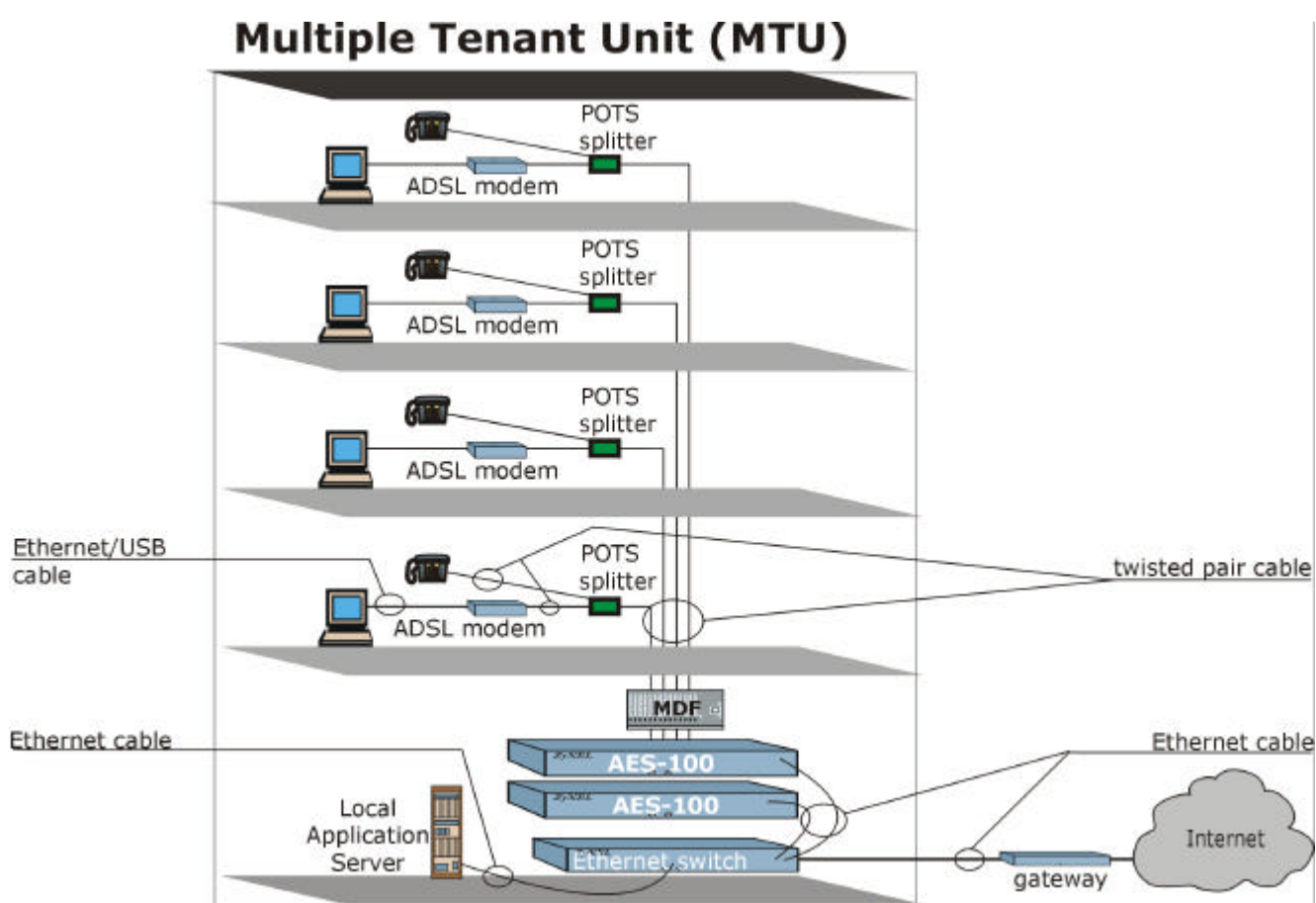


Figure 1-1 MTU Application

1.2.2 ISP Application

The AES-100 can also be used by an Internet Service Provider (ISP) as an IP DSLAM. The AES-100 terminates all of the ADSL ATM circuits and converts the traffic to IP packets. All IP traffic goes directly to the ISP's internal Ethernet network, before being routed to the Internet.

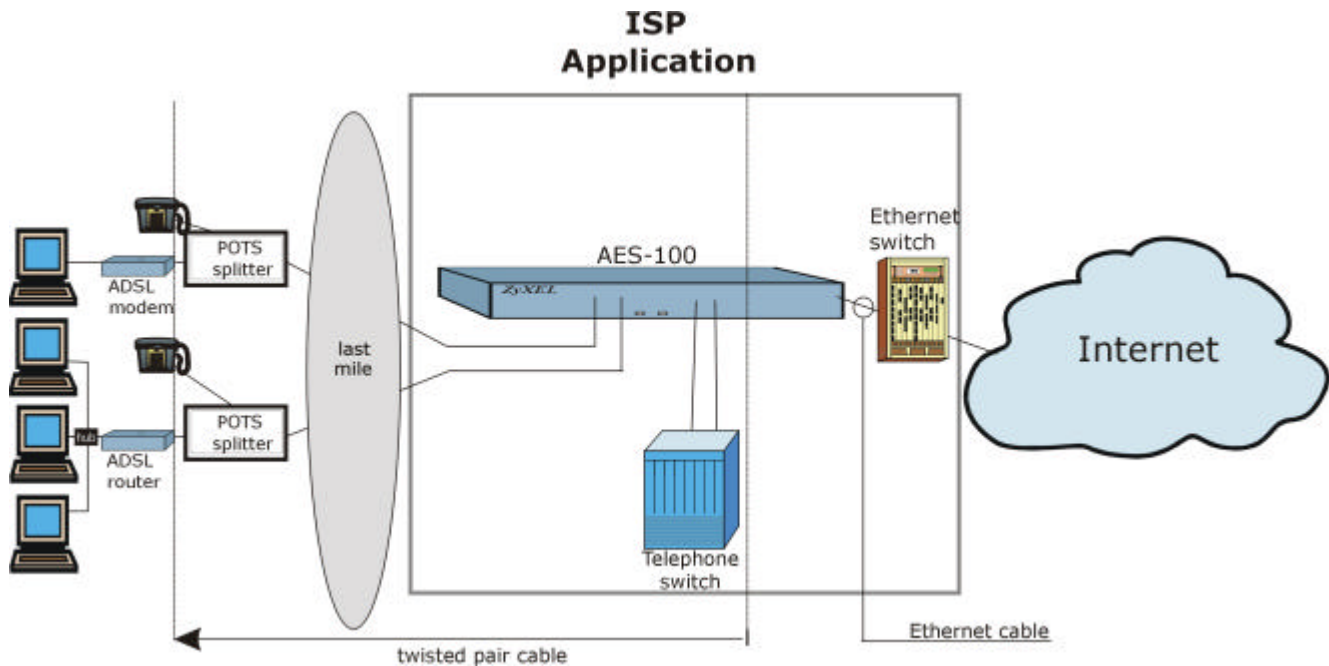


Figure 1-2 ISP Application

1.2.3 Compact Design for Limited Space

The AES-100 occupies only 1.5 U of standard Telco rack space. Its compactness is perfect for collocation (installation in a central office) and basement installation. Because the AES-100 has built-in POTS splitters, service providers do not have to allocate extra space for POTS splitter shelves.

1.2.4 Scalable Platform for Future Expansion

The flexible design of the AES-100 series allows service providers to start with minimum cost. As the number of users and applications increases additional AES-100s can be added to provide greater bandwidth.

1.3 Physical Specifications

Physical Interfaces

- Two network module slots

- Each network module has eight RJ-11 ports to the CO side and eight RJ-11 ports to the USER side
- Each network module has one 10 M Ethernet port
- Each network module has one RS-232 console port for local configuration and management

Dimensions

- In mm: 440 (W) x 320 (L) x 66 (H)

Weight

- 6.84 kg (two network modules loaded)

Power Consumption

- 80 watts maximum
- 100 - 240 VAC, 50/60 Hz

Operating Environment

- Temperature: 0 - 50°C; Humidity: 20% - 95%

Storage Environment

- Temperature: -30 - 60°C; Humidity: 20% - 95%

Chapter 2

Hardware Overview

This chapter gives a brief introduction to the AES-100 hardware.

2.1 Unpacking the AES-100

Before installing, check to see that all the components of the AES-100 are included in the package.

2.2 Additional Installation Requirements

In addition to the contents of the package, you need the following hardware and software components before you install and use your product:

- A computer with an Ethernet 10Base-T NIC (Network Interface Card)
- WAN service provided by a local phone company
- A computer with terminal emulation software configured to the following parameters:
 - VT100 terminal emulation
 - 9600 bps
 - No parity, 8 data bits, 1 stop bit
 - No flow control

2.3 Front Panel

The following figure shows the front panel of the AES-100.

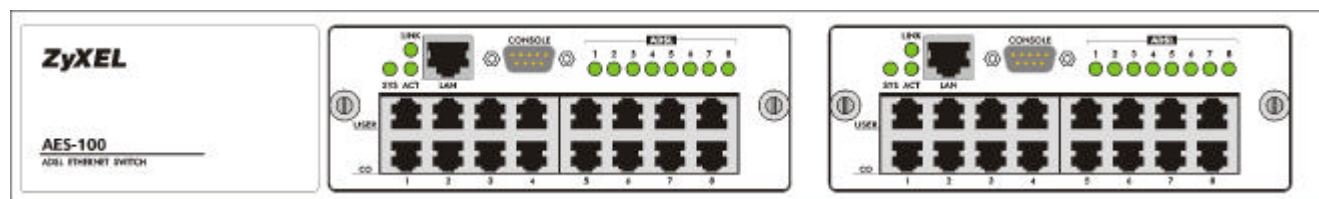


Figure 2-1 AES-100 Front Panel

2.3.1 Front Panel Ports

The following table describes the ports on the front panel of an AES-100 network module.

Table 2-1 Front Panel Ports of an ADSL Network Module

| PORTS | DESCRIPTION |
|----------|---|
| LAN | The LAN port is a 10 Mbps Ethernet port for connection to a router. |
| CONSOLE | The CONSOLE port is an RS-232 port for configuring the AES-100. |
| USER 1-8 | The USER port connects to the user (subscriber) ADSL equipment. |
| CO 1-8 | The CO port connects to the central office or a PBX. |

2.3.2 Front Panel LEDs

The following table describes the LED indicators on the front panel of an AES-100 network module.

Table 2-2 AES-100 Network Module LED Descriptions

| LED | COLOR | STATUS | MEANING |
|----------|-------|-----------------------|---|
| LINK | Green | On Off | The LAN port link is up. The LAN port link is down. |
| SYS | Green | On Off Blinking | Your AES-100 Network Module is on and functioning properly. The system is not ready or has a malfunction. The system is initializing. |
| ACT | Green | Off Blinking | The LAN port is not active. Data is being sent. |
| ADSL 1-8 | Green | On Off | The ADSL link is up. The ADSL link is down. |

2.4 Console Port

For the initial configuration, you need to use terminal emulator software on a computer and connect it to the AES-100 through the console port. Connect the male 9-pin end of the console cable to the console port of the AES-100. Connect the other end (either a female 25-pin or female 9-pin) to a serial port (COM1, COM2 or other COM port)

of your computer. You can use an extension RS-232 cable if the enclosed one is too short. After the initial setup, you can modify the configuration remotely through telnet connections.

2.5 ADSL Port Connections

The line from the user carries both the ADSL and the voice signals. For each line, the AES-100 has a built-in splitter that separates the high frequency ADSL signal from the voice band signal and feeds the ADSL signal to the AES-100, while the voice band signal is diverted to the CO port.

To complete an ADSL connection, connect the line from the user equipment to the **USER** port and the line from the central office switch or PBX (Private Branch Exchange) to the **CO** port. Make sure that the **USER** line and the **CO** line are not shorted on the MDF (Main Distribution Frame).

2.6 Rear Panel

Make sure you are using the correct power source.

The following figure shows the rear panel of the AES-100.



Figure 2-2 AES-100 Rear Panel AC Power Version

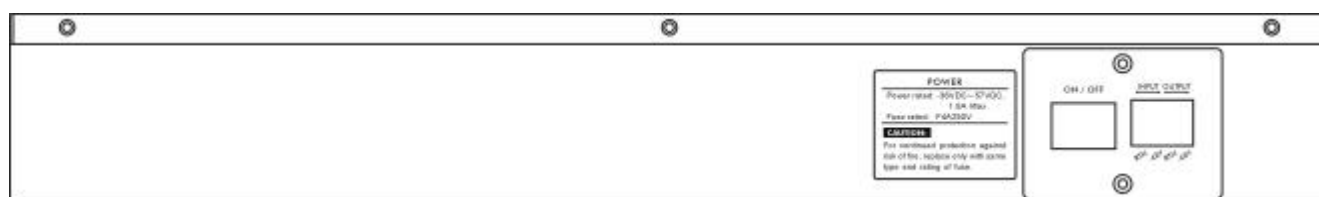


Figure 2-3 AES-100 Rear Panel DC Power Version

Connect the female end of the power cord to the power receptacle on the rear panel of your AES-100 (just to the right of the warning sticker) as seen next. Connect the other end of the cord to a power outlet. Make sure that no objects obstruct the airflow of the fans (located on the side of the unit).

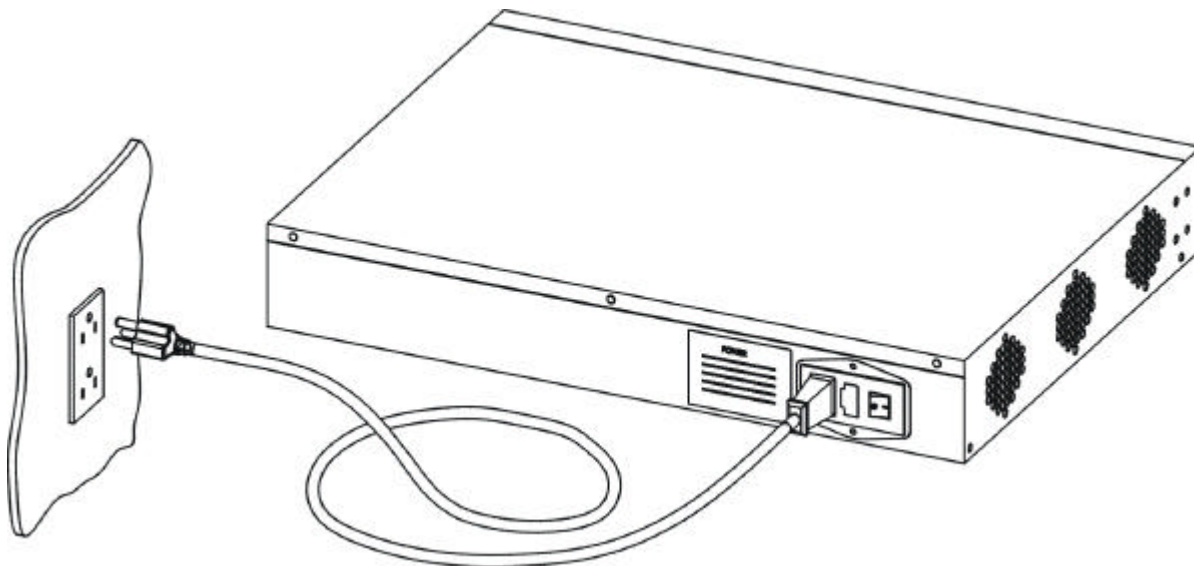


Figure 2-4 Connecting the Power Cord to the AES-100 and a Power Source

Chapter 3

Software Configuration

This section describes the general software configuration of the AES-100 through the command line interface.

3.1 Command Line Interface

The AES-100 uses text command lines as the user interface for software configuration. Before discussing the details of configuration, the rules of the commands are listed below.

1. The command keywords are in regular `courier` font.
2. The command keywords must be entered exactly as shown, i.e., no abbreviations are allowed.
3. The required fields in a command are enclosed in angle brackets (<>), e.g.,

```
list port <port number>
```

means that you must specify the port number for this command.

4. The optional fields in a command are enclosed in square brackets ([]), e.g.,

```
config [save]
```

means that the field `save` is optional.

5. “Command” refers to a command used in the command line interface (CI command).

Use of commands not documented in this manual is hazardous; you can render the system totally unusable.

3.2 Console Connection

For the initial configuration, you must use the console port. After the initial setup, you can *telnet* to the system to perform additional management tasks. To connect to the console port, use an RS-232 cable to connect the AES-100 to a serial (COM) port of a computer.

You can use any terminal emulation program, e.g., Windows' built-in HyperTerminal, with the following parameters:

- VT100 terminal emulation
- 9600 bps
- No parity, 8 data bits, 1 stop bit
- No flow control

3.3 Command Structure

The system uses a two-level command structure. The commands related to one subsystem are grouped under a primary command of that subsystem, e.g., to configure the ADSL parameters, you must first enter the ADSL subsystem by entering the `adsl` command. When you are in a subsystem, the system reminds you by including the subsystem name in the command prompt, e.g.,

```
192.168.1.1 adsl >
```

To get back to the top level prompt from a subsystem, use the `home` command.

3.3.1 Help Facility

The system includes a help facility to provide you with online assistance.

- You can issue the `help` or `?` command at any time. The system will print a list of available commands in response.
- You can issue `help` with a command name to get more details about it, e.g.,

```
> help list
```

The system will respond with the detailed syntax of the `list` command.

3.4 System Commands

The system commands show you the system-related information. They are located on the top level of the two-level command structure.

3.4.1 Uptime Command

Syntax:

```
uptime
```

The `uptime` command shows the elapsed time the system has been running since the last reboot.

3.4.2 Version Command

Syntax:

```
version
```

The `version` command shows the system firmware version.

3.4.3 Restart Command

Syntax:

```
restart
```

The `restart` command instructs the system to perform a warm start, i.e., restarting the system without turning the power on and off.

It is very important that you remember your password. If you forget it, refer to the *Troubleshooting* section for help.

3.4.4 Passwd Command

Syntax:

```
passwd
```

The `passwd` command changes the management password. The management password is used for authentication at console or telnet login. This command is only allowed for local console management sessions. The management password must be from 1 to 8 characters long and any character is accepted. The factory default password is "1234".

3.4.5 Config Print Command

Syntax:

```
config print
```

The `config print` command lists all current system configuration settings.

3.4.6 Config Save Command

Syntax:

```
config save
```

The `config save` command saves all system configurations into nonvolatile memory. You must use this command to save any configurations that you make, otherwise the AES-100 will return to its default settings when it is restarted.

3.4.7 Exit Command

Syntax:

```
exit
```

The `exit` command terminates the console or telnet management session.

Chapter 4

ADSL Configuration

The ADSL (Asymmetrical Digital Subscriber Line) subsystem allows you to configure and monitor the ADSL ports.

4.1 ADSL Standards

The AES-100 supports both the G.lite and the G.dmt standards. G.lite is intended to minimize the cost for the consumer market.

Table 4-1 ADSL Standards

| STANDARD | MAXIMUM DOWNSTREAM | MAXIMUM UPSTREAM |
|----------|--------------------|------------------|
| G.dmt | 8160 Kbps | 1024 Kbps |
| G.lite | 1536 Kbps | 512 Kbps |

4.2 Configured Vs. Actual Speed

You configure the maximum speed of the individual ADSL port using the `set port` command. However, due to noise and other factors on the line, the actual speed may not reach the maximum that you specify.

Even though you can specify arbitrary numbers in the `set port` command, the actual speed is always a multiple of 32 Kbps. If you enter a speed that is not a multiple of 32 Kbps, the actual speed will be the next lower multiple of 32Kbps. For instance, if you specify 60 Kbps for a port, the actual speed for that port will not exceed 32 Kbps, and if you specify 66 Kbps, the actual speed will not be over 64Kbps.

Note that when you configure an ADSL port, the upstream speed must be less than or equal to the downstream speed. Note also that the `list port` command displays the configured parameters of the ADSL port, while the `show port` command displays the actual speeds.

4.3 Default Settings

The factory default settings for all ADSL ports of the AES-100 are

- Encapsulation: RFC 1483
- Multiplexing: LLC-based
- VPI : 0
- VCI : 33

- Enable/Disable State: disabled
- Maximum upstream speed: 512 Kbps
- Maximum downstream speed: 2048 Kbps
- Operational mode: auto

4.4 ADSL Commands

4.4.1 Config Save Command

Syntax:

```
config save
```

The `config save` command saves the ADSL configuration into nonvolatile memory.

4.4.2 Disable Port Command

Syntax:

```
disable port <port number>
```

where

```
<port number> = port number, from 1 to 8
```

The `disable port` command forcibly disables the specified ADSL port.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

4.4.3 Disable Ports Command

Syntax:

```
disable ports
```

The `disable ports` command forcibly disables all ADSL ports.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

4.4.4 Enable Port Command

Syntax:

```
enable port <port number>
```

where

```
<port number> = port number, from 1 to 8
```

The `enable port` command forcibly enables the specified ADSL port.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

4.4.5 Enable Ports Command

Syntax:

```
enable ports
```

The `enable ports` command forcibly enables all ADSL ports.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

4.4.6 Linedata Command

Syntax:

```
linedata <port number>
```

where

```
<port number> = port number, from 1 to 8
```

The `linedata` command shows the line bit allocation of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> linedata 7
```

```
DS carrier load: number of bits per symbol(tone):
```

```
tone  0- 31:  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
tone 32- 63:  0  0  0 22 22 33 33 33 33 33 33 44 33 44 44 44
tone 64- 95:  4 44 44 43 43 33 34 44 33 44 44 34 44 43 33 44
tone 96-127: 44 43 34 44 44 33 43 44 44 34 44 44 33 44 44 44
```

```
tone 128-159: 44 44 44 34 44 34 43 44 33 43 34 33 33 33 33 34
tone 160-191: 43 33 33 34 34 33 23 33 33 33 22 33 33 33 33 33
tone 192-223: 33 33 33 23 22 33 33 33 23 33 33 22 23 22 32
tone 224-255: 22 22 22 22 20 22 22 22 20 0 0 0 0 0 0 0
US carrier load: number of bits per symbol(tone)
tone 0- 31: 0 0 0 0 2 34 55 77 88 89 99 99 99 98 88 87
tone 32- 63: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

The results can determine whether a given sub-carrier loop has sufficient margins to support ADSL data rates, and possibly to determine whether certain specific types of interference or line attenuation exist.

The bit allocation contents are only valid when the link is up.

4.4.7 Lineinfo Command

Syntax:

```
lineinfo <port number>
```

where

```
<port number> = port number, from 1 to 8
```

The lineinfo command shows the line operating values of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> lineinfo 7
```

Current Operating Modes:

```
Data Mode: ATM      Service Type in operation: G.DMT
```

```
Number of Channels (Down/up stream): 1/1
```

```
Downstream Framing Structure      : 3
```

```
Active down/up stream rate option : 1/1
```

```
TRELLIS operation mode is        : ON
```

Current Connection detail:

```
Down/up stream interleaved Delay : 4/ 4 ms
```

```
Downstream Parity byte assigned to fast/interleaved : 0/ 2
```

```
Upstream Parity byte assigned to fast/interleaved : 0/ 2
```

```
Downstream Symbols assigned to fast/interleaved : 0/ 1
```

```
Upstream Symbols assigned to fast/interleaved : 0/ 1
```

```
Down/up stream Depth value : 2/ 2
```

Total Transceiver Output Power : 8dB

Current ATUR Information:

Country code 0

Provider Code 01020304

Capabilities:

g.dmt POTS overlap (Annex A)

The results contain the operating modes, interleave delay, parity byte assignment, parity bytes per codeword, symbols per codeword and interleave depth. Current ATUR Information contains data acquired from the ATU-R (stands for ADSL Termination Unit – Remote, in this case the user' s ADSL modem or router) during negotiation/provisioning message interchanges. It includes the Vendor ID and Version Number obtained from Vendor ID fields (g.994.1) or R-MSG51(T1.413) and country code from Vendor ID (g.994.1).

Information obtained prior to training to steady state transition will not be valid or will be old information.

4.4.8 Lineperf Command

Syntax:

```
lineperf <port number>
```

where

<port number> = port number, from 1 to 8

The lineperf command shows the line performance counters of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> lineperf 7

nfebe-I/nfebe-ni          : 0/0
ncrc-I/ncrc-ni            : 0/0
nfecc-I/nfecc-ni          : 0/0
nfec-I/nfec-ni            : 0/0
nblks-ds/nblks-us         : 120878/120878
nsec-ds/nsec-us           : 2060/2060
n-eb-ds/n-eb-us           : 0/0
n-bbe-ds/n-bbe-us         : 0/0
n-es-ds/n-es-us           : 0/0
n-ses-ds/n-ses-us         : 0/0
non-ses-blks-ds/non-ses-blks-us : 120878/120878
n-uas-ds/n-uas-us         : 0/0
```

```
fe_loss_seconds/ne_loss_seconds : 0/0
fe_fec_seconds/ne_fec_seconds   : 0/0
fast_trains                     : 0
fast_trains_fail                 : 0
```

These counts contain line performance data that has been accumulated since the system started. In the list above the definitions of near end/far end will always be relative to the ATU-C. Downstream (ds) refers to data from the ATU-C and upstream (us) refers to data from the ATU-R.

4.4.9 Linerate Command

Syntax:

```
linerate <port number>
```

where

```
<port number> = port number, from 1 to 8
```

The `linerate` command shows the line rate parameters of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> linerate 7
```

Current Active Rates:

```
AS0 downstream rate      : 2048 Kbps
AS1 downstream rate      :    0 Kbps
LS0 upstream rate        :  512 Kbps
LS1 upstream rate        :    0 Kbps
Down/up stream Margin    : 31/22 dB
Down/up stream Attenuation :  0/ 0 dB
Attainable Dwon/up stream Rate : 11456/ 1344 Kbps
```

These results contain the current downstream and upstream operating values (SHOWTIME) for the requested line, the latest available downstream and upstream margins, channel attenuation and the maximum attainable rate.

Downstream and upstream margins must both be at least 6 dB. The initial downstream and upstream margins are first set during training. The upstream margin is recalculated every 15 seconds during “showtime” at the ATU-C and the downstream margin updates every 15 seconds during “showtime” by using EOC messaging.

Information obtained prior to training to steady state transition will not be valid or will be old information.

4.4.10 List Port Command

Syntax:


```
list port <port number>
```

where

<port number> = port number, from 1 to 8

The `list port` command shows the configured maximum upstream/downstream speeds, the mode (or standard), and enable/disable state of an individual ADSL port.

4.4.11 List Ports Command

Syntax:

```
list ports
```

The `list ports` command shows the configured maximum speeds, modes and states of all ADSL ports.

4.4.12 Set Port Command

Syntax:

```
set port <port number> <upstream speed> <downstream speed> <oper mode>
```

where

| | |
|----------------------|---|
| <port number> = | Port number ranging from 1 to 8. |
| <upstream speed> = | Maximum ADSL upstream speed in Kbps. |
| <downstream speed> = | Maximum ADSL downstream speed in Kbps. |
| <oper mode> = | Operational mode; the available choices are <code>glite</code> , <code>gdmr</code> or <code>auto</code> . |

The `set port` command sets the maximum upstream/downstream speeds and the mode, or standard, of an individual ADSL port. Note that the upstream speed must be less than or equal to the downstream speed.

Even though you can specify arbitrary numbers in the `set port` command, the actual speed is always a multiple of 32 Kbps. If you enter a speed that is not a multiple of 32 Kbps, the actual speed will be the next lower multiple of 32Kbps. For instance, if you specify 60 Kbps for a port, the actual speed for that port will not exceed 32 Kbps, and if you specify 66 Kbps, the actual speed will not be over 64Kbps.

The mode parameter specifies the standard that this port is allowed. When set to `auto`, the AES-100 follows whatever mode is set on the other end of the line.

When the mode is set to `auto` and the negotiated mode is `G.lite`, if the configured speeds exceed those allowed by `G.lite`, the actual speeds are governed by `G.lite`, regardless of the configured numbers.

4.4.13 Set Ports Command

Syntax:

```
set ports <upstream speed> <downstream speed> <oper mode>
```

where

| | |
|---|---|
| <code><upstream speed> =</code> | Maximum ADSL upstream speed in Kbps. |
| <code><downstream speed> =</code> | Maximum ADSL downstream speed in Kbps. |
| <code><oper mode> =</code> | Operational mode; the available choices are <code>glite</code> , <code>gdmt</code> or <code>auto</code> . |

The `set ports` command sets the same maximum upstream/downstream speeds and the mode, or standard, for all ADSL ports. Note that the upstream speed must be less than or equal to the downstream speed.

The mode parameter specifies the standard that the ports are allowed. When set to `auto`, the AES-100 follows whatever mode is set on the other end of the line.

When the mode is set to `auto` and the negotiated mode is `G.lite`, if the configured speeds exceed those allowed by `G.lite`, the actual speeds are governed by `G.lite`, regardless of the configured numbers.

4.4.14 Show Port Command

Syntax:

```
show port <port number>
```

where

```
<port number> = port number, from 1 to 8
```

The `show port` command shows the line status (up or down), the actual upstream/downstream speeds and mode of an individual ADSL port.

4.4.15 Show Ports Command

Syntax:

```
show ports
```

The `show ports` command shows the line status (up or down), the actual upstream/downstream speeds and the mode of all ADSL ports.

Chapter 5

10 Mbps Ethernet Port Configuration

The Ethernet subsystem allows you to configure and monitor the 10 Mbps Ethernet port.

5.1 10 Mbps Ethernet

The AES-100 supports 10 Mbps Ethernet. In a 10 Mbps Ethernet, the duplex mode can be half duplex or full duplex.

The Ethernet port uses the pre-configured duplex mode setting when making a connection, thus requiring you to check the setting of the peer Ethernet port in order to connect.

5.2 Default Settings

The factory default setting for the Ethernet port of the AES-100 is

- Half duplex

5.3 Ethernet Commands

5.3.1 Set Duplex Command

Syntax:

```
set duplex <mode>
```

where

```
<mode> = full or half
```

The `set duplex` command sets the duplex mode used.

5.3.2 Status Command

Syntax:

```
status
```

The `status` command shows the current status of the Ethernet port.

Chapter 6

Bridge Configuration

The bridge subsystem allows you to configure and monitor the bridging and port-based VLAN functions of the AES-100.

The AES-100 supports IEEE 802.1d transparent bridging; but not the static filtering feature or spanning tree protocol. The bridge learns the source MAC addresses of sender hosts by inspecting incoming Ethernet frames and recording the learned MAC addresses with their incoming port numbers into its filtering database. Based on the database, the bridge forwards each incoming frame to its destination port.

6.1 Bridge Port Numbers

The bridge subsystem of the AES-100 defines its own numbering convention for ports. The bridge has a total of nine ports; bridge port 1 stands for Ethernet port, bridge port 2 stands for ADSL port 1, bridge port 3 stands for ADSL port 2, and so on. Be sure you have clarified the relation between bridge ports and ADSL ports.

6.2 Port-Based VLAN

The VLAN (Virtual LAN) mechanism can be used to limit the broadcast domain to the members of a VLAN group only. Users of one group are not allowed to access the resources of other groups and a higher level of security is achieved.

The AES-100 supports port-based VLAN, one type of VLAN implementation. Port-based VLAN requires each incoming port to define its allowed outgoing ports. Ethernet frames are forwarded according to these rules.

6.2.1 Default Settings of Port-Based VLAN

The factory default settings for the port-based VLAN of the AES-100 are:

- Bridge port 1 (Ethernet port) allowed to all bridge ports
- Bridge port 2 (ADSL port 1) allowed to bridge port 1 (Ethernet port) only
- Bridge port 3 (ADSL port 2) allowed to bridge port 1 (Ethernet port) only
- Bridge port 4 (ADSL port 3) allowed to bridge port 1 (Ethernet port) only
- Bridge port 5 (ADSL port 4) allowed to bridge port 1 (Ethernet port) only
- Bridge port 6 (ADSL port 5) allowed to bridge port 1 (Ethernet port) only
- Bridge port 7 (ADSL port 6) allowed to bridge port 1 (Ethernet port) only
- Bridge port 8 (ADSL port 7) allowed to bridge port 1 (Ethernet port) only

- Bridge port 9 (ADSL port 8) allowed to bridge port 1 (Ethernet port) only

It is recommended that you do not alter these settings, or the AES-100 may not work correctly.

The default VLAN settings allow each ADSL port to communicate back and forth with only the Ethernet port, and not with other ADSL ports. The following figure illustrates this.

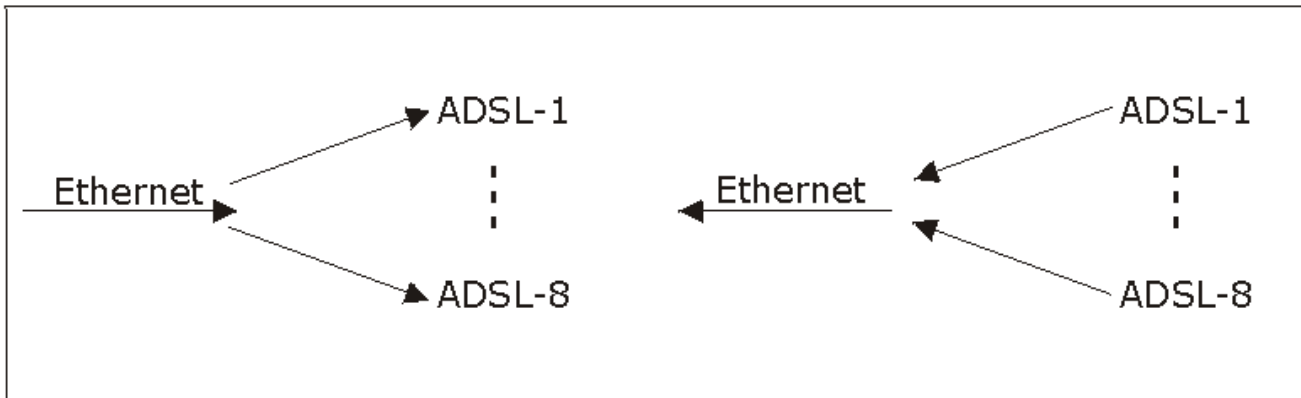


Figure 6-1 Default VLAN Settings

6.3 Bridge Commands

6.3.1 Device Command

Syntax:

```
device
```

The `device` command shows information on all bridge ports.

6.3.2 Filter Command

Syntax:

```
filter
```

The `filter` command displays the filtering database.

6.3.3 Filterage Command

Syntax:

```
filterage [age]
```

where

```
age = aging out timer period in seconds
```

The `filterage` command sets or shows the aging out timer period of the filtering database. It is recommended that you use the default setting. If the time interval is reduced to a setting that is too short, it could increase broadcast traffic and reduce the available bandwidth.

6.3.4 Flush Command

Syntax:

```
flush [port]
```

where

[port] = bridge port number, from 1 to 9

The `flush` command flushes out the filtering database of the specified bridge port. If the `<port>` field is omitted, this command will flush out the filtering databases of all ports.

6.3.5 Info Command

Syntax:

```
info
```

The `info` command shows the software number of the bridge implementation and the maximum size of the filtering database.

6.3.6 Status Command

Syntax:

```
status
```

The `status` command displays the bridge status.

6.4 Port-Based VLAN Commands

6.4.1 Portfilter Command

Syntax:

```
portfilter [<source port> all|<dest ports>]
```

where

<source port> = incoming bridge port number, from 1 to 9

all = all bridge ports are allowed outgoing ports

<dest ports> = the allowed outgoing bridge port number, separate by a space if there is more than one port

The `portfilter` command sets or displays the port-based VLAN configuration.

An example is shown next.

```
192.168.1.1 > bridge
```

```
192.168.1.1 bridge> portfilter
```

```
Port 1 (edd):    all
Port 2 (bun/port=atm:0/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 3 (bun/port=atm:1/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 4 (bun/port=atm:2/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 5 (bun/port=atm:3/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 6 (bun/port=atm:4/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 7 (bun/port=atm:5/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 8 (bun/port=atm:6/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 9 (bun/port=atm:7/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
```

The above shows the current configuration of the port-based VLAN. It is the same as the default settings.

An example with an altered configuration is shown next.

```
192.168.1.1 > bridge
```

```
192.168.1.1 bridge> portfilter 2 1 3
```

```
192.168.1.1 bridge> portfilter 3 1 2
```

This example sets the allowed outgoing bridge ports of port 2 (ADSL port 1) to port 1 (Ethernet port) and port 3 (ADSL port 2). The allowed outgoing bridge ports of port 3 (ADSL port 2) are set to port 1 (Ethernet port) and port 2 (ADSL port 1). This way ADSL ports 2 and 3 can communicate with each other and the Ethernet port. You can see the effects of this example by using the following command:

```
192.168.1.1 bridge> portfilter
```

```
Port 1 (edd):    all
Port 2 (bun/port=atm:0/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1 3
Port 3 (bun/port=atm:1/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1 2
Port 4 (bun/port=atm:2/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 5 (bun/port=atm:3/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 6 (bun/port=atm:4/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 7 (bun/port=atm:5/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 8 (bun/port=atm:6/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
Port 9 (bun/port=atm:7/rfc1483=true/txvpi=0/txvci=33/rxvpi=0/rxvci=33):  1
```


The following figures illustrate the above example. Notice that ports 2 (ADSL port 1) and 3 (ADSL port 2) are able to communicate with each other, as well as with the Ethernet. All of the other ports will only be able to communicate with the Ethernet port.

This first figure illustrates the first command line. Port 1 (the Ethernet port) is linked to all 8 ADSL ports.

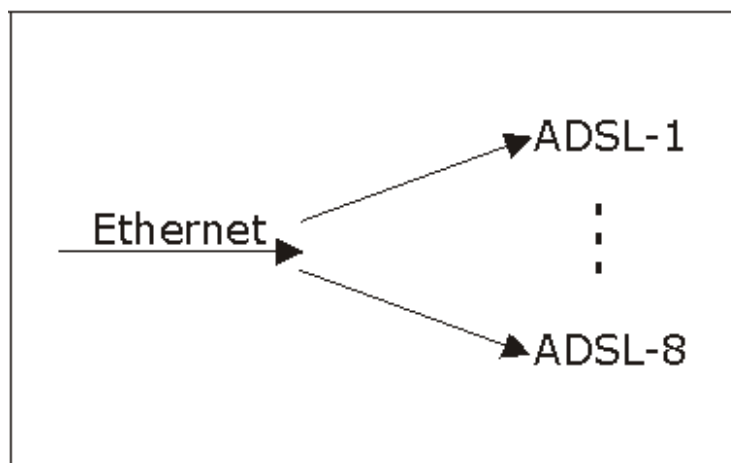


Figure 6-2 Example of Modified VLAN Port 1

The following figure illustrates the second command line. Port 2 (ADSL port 1) is able to send to both the Ethernet port and port 3 (ADSL port 2).

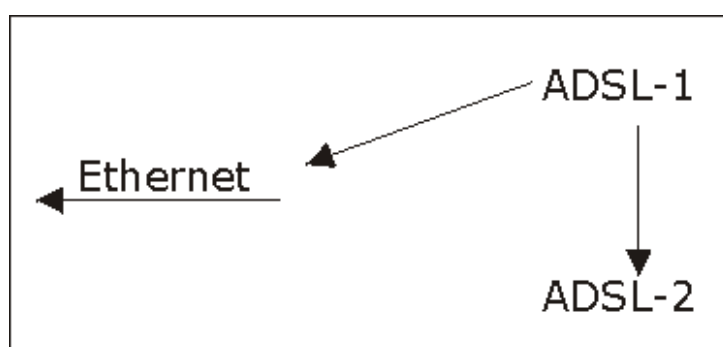
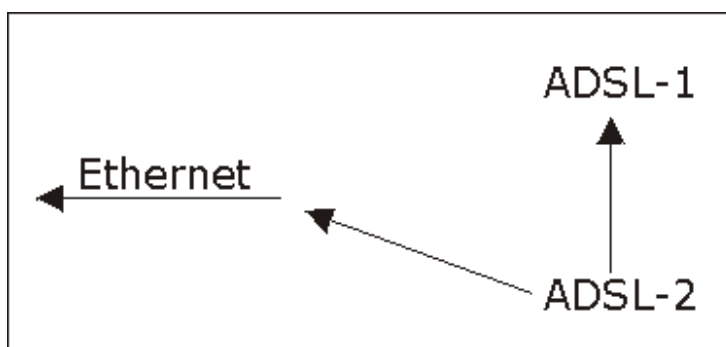
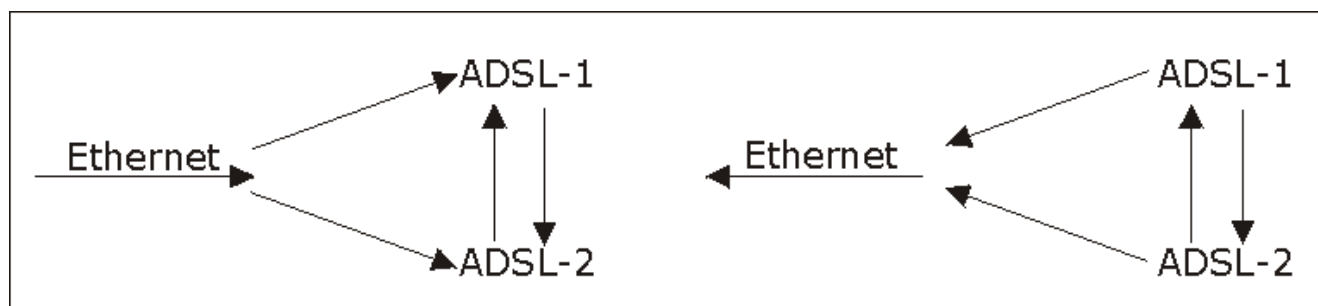


Figure 6-3 Example of Modified VLAN Port 2

The following figure illustrates the third command line. Port 3 (ADSL port 2) is able to send to both the Ethernet port and port 2 (ADSL port 1).

**Figure 6-4 Example of Modified VLAN Port 3**

This figure illustrates the fact that port 1 (the Ethernet port) is linked to ports 2 (ADSL port 1) and 3 (ADSL port 2). Ports 2 (ADSL port1) and 3 (ADSL port 2) are also linked to each other.

**Figure 6-5 Example of Modified VLAN Settings**

Chapter 7

IP Configuration

This chapter shows you how to configure the IP (Internet Protocol) parameters. The IP host implementation in the AES-100 allows you to manage it over the network.

More often than not, you have more than one AES-100 for a particular installation. Before you start configuring the AES-100s, make sure that you

1. Plan ahead.
2. Have a complete diagram showing the whole network.
3. Record the IP parameters assigned to the equipment in your network.

7.1 Setting the IP Address

To set the AES-100's IP address, subnet mask and default route, use the following command sequence:

1. 192.168.1.1> ip
2. 192.168.1.1 ip> device delete ether
3. 192.168.1.1 ip> device add ether ether //bridge <new ip address>
4. 192.168.1.1 ip> route delete default
5. 192.168.1.1 ip> route add default 0.0.0.0 <default gateway> 00:00:00:00
6. 192.168.1.1 ip> config save
7. 192.168.1.1 ip> restart

Line 1 brings you to the IP subsystem.

Line 2 clears the old parameters of the AES-100.

Line 3 adds the new IP address for the AES-100. The system will automatically compute the subnet mask when the system is restarted. If you want to specify a subnet manually, add the following two commands before line 4:

- 3.1 192.168.1.1 ip> subnet delete ether.home
- 3.2 192.168.1.1 ip> subnet add ether.home ether <subnet address> <subnet mask>

Where <subnet mask> is the subnet mask in hexadecimal, for example "ff:ff:ff:00".

Line 4 deletes the existing default route.

Line 5 adds the new default route. The default route tells the system where the gateway (next hop) is when the AES-100 sends packets to a destination that is not on the same subnet as the AES-100.

Line 6 saves the new configuration to the nonvolatile memory.

Line 7 tells the system to restart, in order to make the IP address configuration take effect. The AES-100 does not need to be restarted after configuration of other items.

For example, if you want the AES-100 to have 172.21.100.1 as the IP address, 255.255.255.0 for the subnet mask and 172.21.100.254 for the default gateway, you may use the following command sequence:

```
192.168.1.1> ip
192.168.1.1 ip> device delete ether
192.168.1.1 ip> device add ether ether //bridge 172.21.100.1
192.168.1.1 ip> subnet delete ether.home
192.168.1.1 ip> subnet add ether.home ether 172.21.100.0 ff:ff:ff:00
192.168.1.1 ip> route delete default
192.168.1.1 ip> route add default 0.0.0.0 172.21.100.254 00:00:00:00
192.168.1.1 ip> config save
192.168.1.1 ip> restart
```

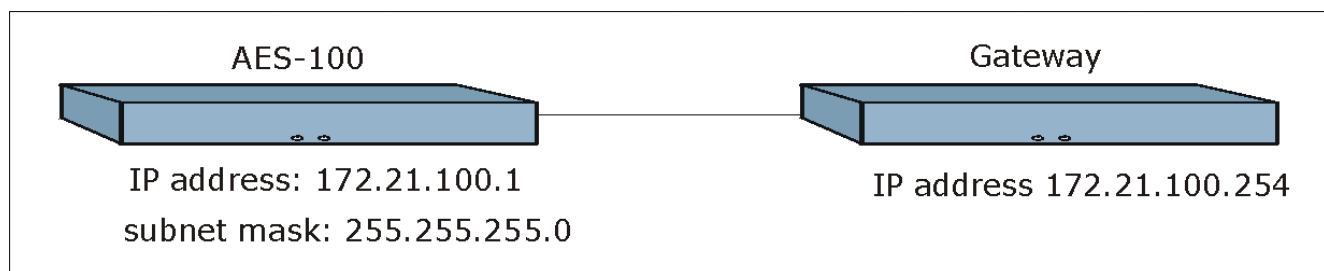


Figure 7-1 Setting IP Address and Default Gateway

The AES-100 leaves the factory with a default IP address of 192.168.1.1 and a subnet mask of 255.255.255.0, or FF.FF.FF.0 in hexadecimal notation, and the default gateway set at 192.168.1.254. Make sure that you configure the IP parameters correctly before you connect an AES-100 to the network, otherwise, you may interrupt services already running.

7.2 General IP Commands

The following is a list of general IP commands that help with the management of the IP parameters.

7.2.1 Config Command

Syntax:

```
config [save]
```

This command shows the IP configuration. The `save` option saves the configuration to the nonvolatile memory.

7.2.2 Ping Command

Syntax:

```
ping <host> [<ttl> [<size>]]
```

This is an IP facility to check for network functionality by sending an echo request to another IP host and waiting for the reply. The `host` parameter specifies the IP address of the target. The optional `ttl` (time to live) limits the number of hops (routers) that the echo request can travel before it reaches the target. The `size` parameter specifies the size of the payload, i.e., not counting the headers, of the echo request; the default size is 32 octets.

7.2.3 Statistics Command

Syntax:

```
stats <sub cmd>
```

This command shows the statistics for the traffic of the type specified by the sub-command. Statistics are available for the following traffic types: ARP, ICMP, IP, raw, TCP and UDP.

7.2.4 Version Command

Syntax:

```
version
```

This command shows the software number of the IP implementation.

Chapter 8

Remote Management

This chapter shows you how to manage the AES-100 remotely.

More often than not, you will have the AES-100 located remotely making its remote management very useful.

8.1 Management by Telnet

After you have set up the IP parameters and connected the AES-100 to the network, you can manage it remotely with telnet. You can use any telnet client that you find convenient. The configuration procedures with telnet are exactly the same as those using the direct connection via the console port. The default password for a telnet session is "1234". Although telnet will work while the console port is being used, only one telnet session is allowed at a time.

8.2 SNMP Management

SNMP (Simple Network Management Protocol) is a protocol used for exchanging management information between network devices. The AES-100 supports SNMP version 2 agent functionality, which allows a manager station to manage and monitor it through the network.

The next figure illustrates an SNMP management operation.

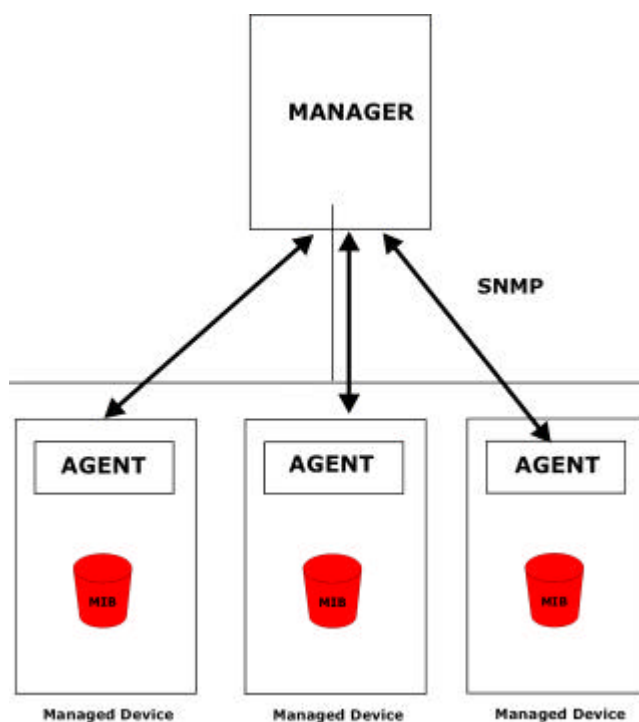


Figure 8-1 SNMP Management Model

An SNMP managed network consists of two main component types: agents and a manager.

An agent is a management software module that resides in a managed device (the AES-100). An agent translates the local management information from the managed device into a form compatible with SNMP. The manager is the station through which network administrators perform network management functions. It executes operations that control and monitor the managed devices.

The managed devices contain objects that define each piece of information to be collected about a device. Examples of variables include the number of packets received, node port status, etc. A Management Information Base (MIB) is a collection of managed objects. SNMP allows manager and agents to communicate for the purpose of accessing these objects.

SNMP itself is a simple request/response protocol based on the manager/agent model. The manager issues a request and the agent returns responses using the following protocol operations:

- ◆ Get
Allows the manager to retrieve an object variable from the agent.
- ◆ GetNext
Allows the manager to retrieve the next object variable from a table or list within an agent. In SNMPv1, when a manager wants to retrieve all elements of a table from an agent, it initiates a Get operation, followed by a series of GetNext operations.
- ◆ Set
Allows the manager to set values for object variables within an agent.
- ◆ Trap
Used by the agent to inform the manager of some events.

8.2.1 Supported MIBs

The AES-100 supports MIB II that is defined in RFC-1213 and RFC-1215 as well as transparent bridge MIBs defined in RFC 1493. The AES-100 can also respond with specific data from the ZyXEL private MIB (ZYXEL-MIB).

8.3 SNMP Access Configuration

To control access to the agent in the AES-100, use the `access` commands in the SNMP subsystem. Note that “community” is SNMP’s terminology for password. After configuring the SNMP access parameters, save the configuration to the nonvolatile memory with the `config save` command. The default write community string is “1234”, and the default read community string is “public”.

8.3.1 SNMP Access Read/Write Command

Syntax:


```
access <read | write> <community> [<IP addr>]
```

where

<read | write> = Specifies read-only/read-write permission.
<community> = Password needed to access the SNMP agent on the AES-100.
[<IP addr>] = Optional IP address of the allowed SNMP manager.

This command allows read-only or read-write access. If the IP address is specified, access is allowed for the manager station with that address only.

8.3.2 SNMP Access Delete command

Syntax:

```
access delete <community> [<IP addr>]
```

This command revokes SNMP access by the specified community (password). If the IP address is specified, access is denied for that manager station only.

8.3.3 SNMP Access Flush Command

Syntax:

```
access flush
```

This command revokes access by any and all manager stations.

8.3.4 SNMP Access List Command

Syntax:

```
access list
```

This command shows the allowed access.

8.4 SNMP Trap Configuration

The AES-100 uses the SNMP trapping facility to proactively report unusual events to one or more trap servers. To configure the trap parameters, use the `trap` commands in the SNMP subsystem. After configuring the SNMP trap parameters, save the configuration to the nonvolatile memory with the `config save` command.

8.4.1 Supported Traps

AES-100 supports the following traps

- ◆ coldStart Trap (defined in RFC-1215) :

This trap is sent at system start-up.

- ◆ authenticationFailure Trap (defined in RFC-1215) :

This trap is sent if a request arrives with an invalid community string.

- ◆ linkUp Trap (defined in RFC-1215) :

This trap is sent when an ADSL port is up.

- ◆ linkDown Trap (defined in RFC-1215) :

This trap is sent when an ADSL port is down.

8.4.2 Trap Add Command

Syntax:

```
trap add <community> <IP addr> [<port>]
```

where

<community> = The password used by the AES-100 to authenticate itself to the trap server.

<IP addr> = The IP address of the trap server.

[<Port>] = The optional port parameter is for specifying the UDP port number on the server in case it is different from the default of port 162.

This command adds a trap server.

8.4.3 Trap Delete Command

Syntax:

```
trap delete <community> <IP addr> [<port>]
```

This command deletes a trap destination. The parameters are the same as the `trap add` command.

8.4.4 Trap Flush Command

Syntax:

```
trap flush
```

This command deletes all trap destinations.

8.4.5 Trap List Command

Syntax:

```
trap list
```

This command lists all the trap destinations.

Chapter 9

Configuration Backup/Restore

This chapter describes the process for backing up your user settings (configuration) from the AES-100 onto your computer and how to restore them to the AES-100.

The AES-100 uses TFTP for configuration backup/restore through its built-in TFTP server. You can use any TFTP client to connect to the AES-100.

Do not turn off the AES-100 during the updating process, as it may corrupt the firmware and make your AES-100 unusable.

9.1 Configuration Files of the AES-100

The AES-100 uses configuration files to store the user's settings, so they can be applied the next time the AES-100 is booted. The AES-100 has the following seven important configuration files:

| | |
|---------------------------|---|
| <code>initadsl =</code> | The configuration file for ADSL ports. |
| <code>resolve =</code> | The configuration file for IP parameters. |
| <code>initbridge =</code> | The configuration file for bridge settings. |
| <code>password =</code> | The configuration file for the console and Telnet password. |
| <code>services =</code> | The configuration file for IP services. |
| <code>initether =</code> | The configuration file for Ethernet port settings. |
| <code>snmpinit =</code> | The configuration file for SNMP settings. |

9.2 Control Files Used In TFTP Operation

TFTP is a simple file transfer protocol and lacks a password checking feature. The AES-100 requires users to transfer a special file to achieve authentication functions. This file contains the SNMP's write community string. In addition, there may be more than one configuration file to restore into the AES-100, so it is necessary to tell the AES-100 the beginning and end of the list of configuration files you want to restore. This way the AES-100 can know when to write the restored configuration files to nonvolatile memory. There are three control files used in TFTP operation:

| | |
|-----------------------------|--|
| <code>tftplock.key =</code> | This file contains the SNMP write community string (password). |
| <code>tftpupdt.beg =</code> | An empty file (with no content). Acts as a mark of the beginning of the restore process, used only in restoration. |
| <code>tftpupdt.end =</code> | An empty file (with no content). Acts as a mark of the end of the restore process, used only in restoration. |

9.3 Configuration Backup

You can backup all or some configuration files from the AES-100 to your computer. For example, to backup the configuration of ADSL ports and IP settings, the procedure on your computer is as follows:

Step 1. Connect to the AES-100 with your favorite TFTP client. The command is generally

```
tftp <AES-100 IP address>
```

at the computer command prompt.

Step 2. Set the binary mode.

```
tftp> binary
```

Step 3. Transfer/Get the control file and configuration files to/from the AES-100

```
tftp> put tftpload.key
```

```
tftp> get initadsl
```

```
tftp> get resolve
```

where

tftpload.key = The file containing the SNMP write community string (password).

initadsl = The configuration file for ADSL ports.

resolve = The configuration file for IP parameters.

Step 4. Quit TFTP.

```
tftp> quit
```

9.4 Configuration Restore

You can restore all or some configuration files from your computer to the AES-100. For example, to restore the configuration of ADSL ports and IP settings, the procedure on your computer is as follows:

Step 1. Connect to the AES-100 with your favorite TFTP client. The command is generally

```
tftp <AES-100 IP address>
```

at the computer command prompt.

Step 2. Set the binary mode.

```
tftp> binary
```

Step 3. Transfer control files and configuration files to the AES-100.

```
tftp> put tftpload.key
```

```
tftp> put tftpupdt.beg
```

```
tftp> put initadsl  
tftp> put resolve  
tftp> put tftpupdt.end
```

where

| | |
|----------------|--|
| tftplock.key = | The file that contains the SNMP write community string (password). |
| tftpupdt.beg = | An empty file (with no content). Marks the beginning of the restore process, used only in restoration. |
| initadsl = | The configuration file for ADSL ports. |
| resolve = | The configuration file for IP parameters. |
| tftpupdt.end = | An empty file (with no content). Marks the end of the restore process, used only in restoration. |

Step 4. Quit TFTP.

```
tftp> quit
```

Wait for the update to finish and then restart the AES-100.

Chapter 10

Firmware Upload

ZyXEL periodically releases new firmware for the AES-100 for bug fixes and enhancements. Please check the web site at www.zyxel.com every now and then for the latest firmware release.

The AES-100 has two ways to update firmware; one is done through BOOTP/TFTP and the other uses TFTP. The differences between these two methods are as follows:

- ◆ Update timing:
A BOOTP/TFTP update is done when the AES-100 is restarted, while a TFTP update is done during operation.
- ◆ Protocols used:
A BOOTP/TFTP update uses BOOTP and TFTP protocols, while a TFTP update uses TFTP protocol only.
- ◆ Remote update:
A BOOTP/TFTP update requires the AES-100 and your computer to be located on the same LAN, but a TFTP update does not have this restriction.
- ◆ Firmware files used:
A BOOTP/TFTP update uses a file with a “.bin” extension name, while a TFTP update uses a file with an “.img” extension name.
- ◆ The role of the AES-100:
A BOOTP/TFTP update uses the AES-100's built-in BOOTP/TFTP client, and a TFTP update uses the AES-100's built-in TFTP server.
- ◆ The impact to the AES-100:

A BOOTP/TFTP update overwrites the AES-100's firmware and all configuration files, while a TFTP update overwrites the AES-100's firmware only.

10.1 BOOTP/TFTP Firmware Update of the AES-100

The AES-100 uses BOOTP/TFTP for firmware updates through its built-in BOOTP/TFTP client when the AES-100 is restarted. To update the firmware, first download it from the ZyXEL web site and store it on your computer. You can use any BOOTP/TFTP server (for example, BootpTftp.exe) to update the AES-100's firmware. The update procedure for BootpTftp.exe is as follows:

Do not turn off the AES-100 during the updating process, as it may corrupt the firmware and make your AES-100 unusable.

- Step 1.** Connect your AES-100's LAN port to a computer's LAN port directly using a crossover Ethernet cable, or connect both to an Ethernet hub/switch using straight-through cables.

Step 2. Connect your AES-100' s console port to a computer' s serial port with an RS-232 cable.

Step 3. Run any terminal emulation program, e.g., Windows' built-in HyperTerminal, with the following parameters:

- VT100 terminal emulation
- 9600 bps
- No parity, 8 data bits, 1 stop bit
- No flow control

Step 4. Run BootpTftp.exe, to bring up the following window.

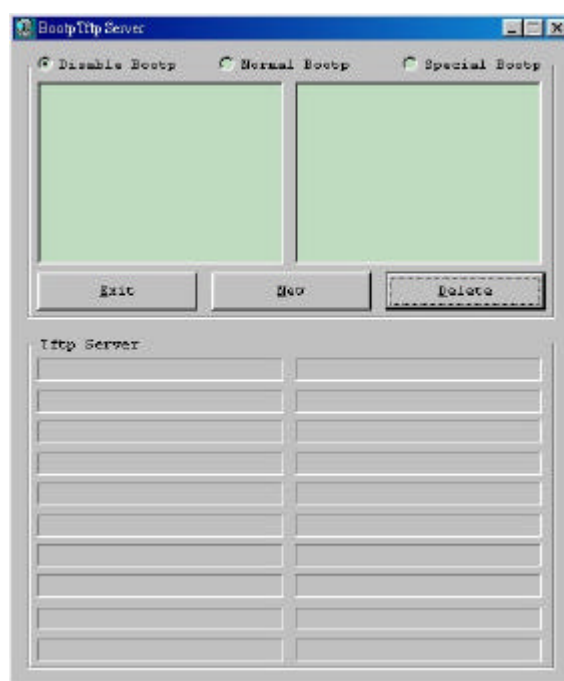
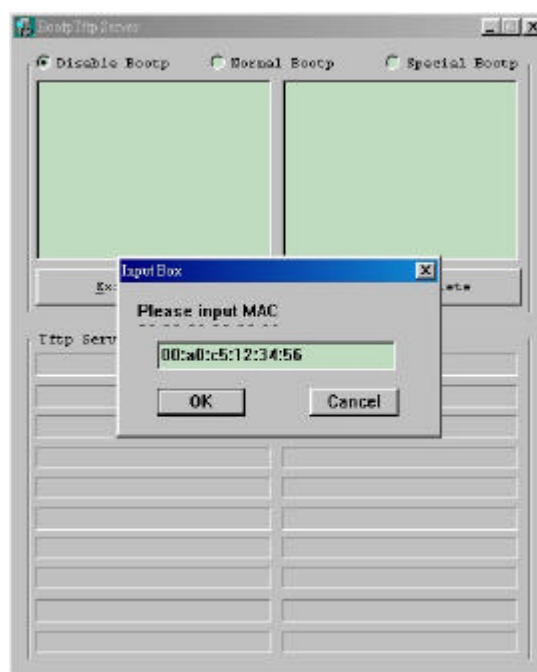


Figure 10-1 BOOTP/TFTP Server

Step 5. Click the **New** button to create a MAC address entry. The **Input Box** window will pop up as shown next.

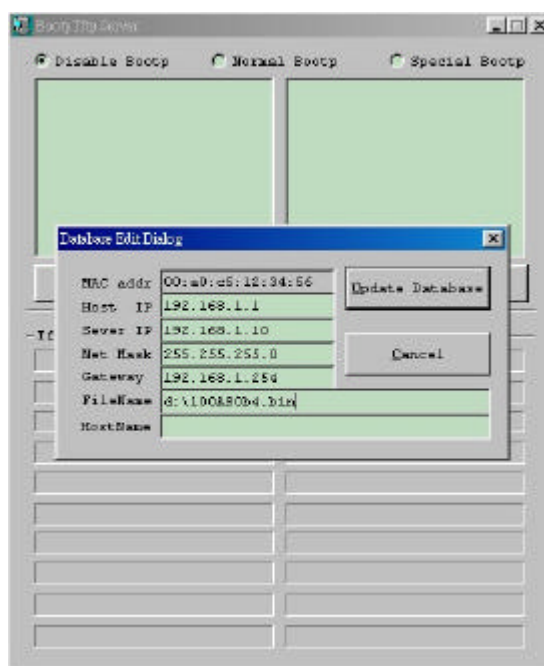
Step 6. Input the MAC address of the AES-100 and then click **OK**. You can find the MAC address of the AES-



100 on its boot console.

Figure 10-2 Input MAC

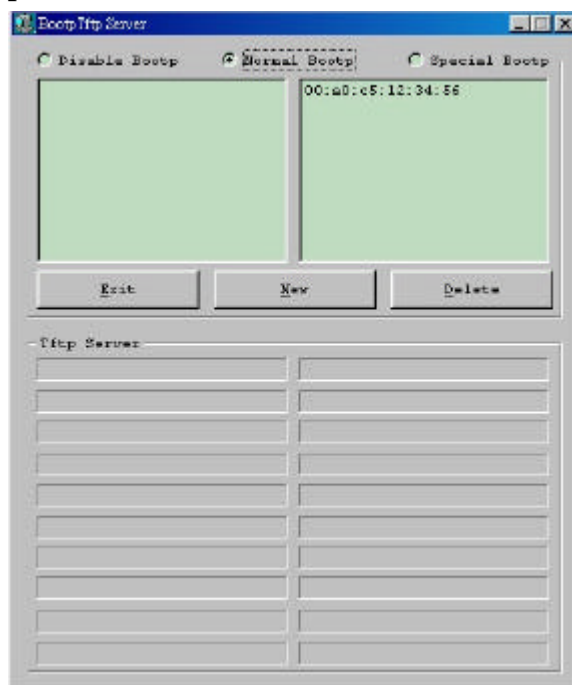
Step 7. Set up the host address (the IP address you want to assign to the AES -100), server address (the IP address of this computer), net mask, gateway and filename (the new firmware name). Click **Update**



Database .

Figure 10-3 Database Edit Dialog

Step 8. Choose **Normal Bootp** to enable normal BOOTP/TFTP functions.

**Figure 10-4 Enable BOOTP/TFTP**

Step 9. Restart the AES-100 and press any key within three seconds to get the following console window:

```
SDRAM Testing . . .

AES-100 Boot Loader, Feb 7 2001 12:06:03
Copyright © 2001 ZyXEL Communications Corp.

Mac address 00:A0:C5:12:34:56
```

Figure 10-5 Enter Debug Mode

Step 10. Enter `atnb` at the AES-100 boot console.

Step 11. Wait for the firmware upload to finish.

Step 12. Use the following command sequence on the AES-100 to write new firmware to flash memory.

- 192.168.1.1> flashfs
- 192.168.1.1 flashfs> wipe
- 192.168.1.1 flashfs> update

Wait for the update to complete and then restart the AES-100.

10.2 TFTP Firmware Update on the AES-100

The AES-100 uses TFTP for firmware updates through its built-in TFTP server when the AES-100 is operational. To update the firmware, first download it from the ZyXEL web site and store it on your computer. You can use any TFTP client to connect to the AES-100. The procedure for TFTP update is similar to the procedure for restoring configuration.

Do not turn off the AES-100 during the updating process, as it may corrupt the firmware and make your AES-100 unusable.

To update firmware by TFTP, the procedure is as follows:

Step 1. Connect to the AES-100 with your favorite TFTP client. The command is generally

```
tftp <AES-100 IP address>
```

at the computer command prompt.

Step 2. Set the binary mode.

```
tftp> binary
```

Step 3. Transfer control files and firmware file to the AES-100.

```
tftp> put tftpload.key
```

```
tftp> put tftpupdt.beg
```

```
tftp> put 100AS0b4.img image
```

```
tftp> put tftpupdt.end
```

where

tftpload.key = The file which contains the SNMP write community string (password).

tftpupdt.beg = An empty file (with no content).

100AS0b4.img = The firmware file used in the TFTP update.

image = The firmware file name used in the AES-100 (fixed).

tftpupdt.end = An empty file (with no content).

Step 4. Quit TFTP.

```
tftp> quit
```

Wait for the update to finish and then restart the AES-100

Chapter 11

Troubleshooting

This chapter covers potential problems and possible remedies. After each problem description, some steps are provided to help you diagnose and solve the problem.

11.1 ADSL LED(s)

An ADSL LED is not on.

Table 11-1 Troubleshooting the ADSL LED(s)

| STEPS | CORRECTIVE ACTION |
|-------|---|
| 1 | Unplug the phone wire coming from the USER port of the AES-100 and connect the user' s ADSL modem or router directly to the USER port of the AES-100 using a different telephone wire. If the LED turns on, check for a problem with the building' s phone wire. |
| 2 | Make sure the ADSL port is enabled (refer to the section on <i>enabling ADSL ports</i>). |
| 3 | If the LED remains off, contact the distributor. |

11.2 Data Transmission

The ADSL LED is on, but data can not be transmitted.

Table 11-2 Troubleshooting Data Transmission

| STEPS | CORRECTIVE ACTION |
|-------|---|
| 1 | Unplug the phone wire coming from the USER port of the AES-100 and connect the user' s ADSL modem or router directly to the USER port of the AES-100 using a different telephone wire. If data can be transmitted, check for a problem with the building' s phone wire. |
| 2 | Check to see that the VPI/VCI settings in the user' s ADSL modem or router match those in the AES-100 (refer to the <i>Default Settings</i> in the <i>ADSL Configuration</i> chapter of this User' s Guide). Also make sure that it is using RFC-1483 encapsulation, bridge mode and LLC- based multiplexing. |
| 3 | Make sure that the device type of the AES-100' s IP address is set to bridge (refer to the <i>Setting IP Address</i> section). |
| 4 | Check the VLAN configuration of the AES-100 (refer to the <i>Bridge Configuration</i> chapter). |
| 5 | Ping the AES-100 from the user' s computer. |
| 6 | If you cannot ping, connect the ADSL modem or router to another AES-100 ADSL port. If the ADSL modem or router works with a different port, then there may be a problem with the port user' s original port. Contact the distributor. |
| 7 | If using a different port does not work, try a different ADSL modem or router with the original port. |

11.3 ADSL LED(s) turn On and Off

An ADSL LED turns on and off intermittently.

Table 11-3 Troubleshooting a Non-Constant ADSL LED

| STEPS | CORRECTIVE ACTION |
|-------|--|
| 1 | Unplug the phone wire coming from the USER port of the AES-100 and connect the user' s ADSL modem or router directly to the USER port of the AES-100 using a different telephone wire. If the ADSL LED stays on, check for a problem with the building' s phone wire. |
| 2 | Use the <code>linate</code> command to check the user' s regular telephone wire (refer to the <i>ADSL Configuration</i> chapter). If the ADSL LED still turns on and off repeatedly, contact the distributor. |

11.4 Data Rate

The SYNC-rate is not the same as the configured rate.

Table 11-4 Troubleshooting the SYNC-rate

| STEPS | CORRECTIVE ACTION |
|-------|--|
| 1 | Unplug the phone wire coming from the USER port of the AES-100 and connect the user' s ADSL modem or router directly to the USER port of the AES-100 using a different telephone wire. If the rates match, the regular phone wire quality may be limiting the speed to a certain rate (see the <i>Configured Vs. Actual Speed</i> section). |
| 2 | Use the <code>linate</code> command to check the user' s regular telephone wire (refer to the <i>ADSL Configuration</i> chapter). If they do not match when a good wire is used, contact the distributor. |

11.5 Configured Settings

The AES-100' s configured settings do not take effect at restart.

Table 11-5 Troubleshooting the AES-100' s Configured Settings

| CORRECTIVE ACTION |
|--|
| After you finish configuring the settings, remember to use the <code>config save</code> command to save your settings to the AES-100. If this does not work, contact the distributor. |

11.6 Password

I forgot the password to my AES-100.

Table 11-6 Troubleshooting the Password

| OPTIONS | CORRECTIVE ACTION |
|---------|--|
| 1 | Send a screen shot of your AES-100' s MAC address to your local distributor. |
| 2 | Refer to the <i>BOOTP/TFTP Firmware Update</i> section to update your firmware. All settings will return to default value, so any configurations you have made will be lost. |

11.7 Remote Server

The user' s computer behind the ADSL modem or router can not access a remote server.

Table 11-7 Troubleshooting a Remote Server

| STEPS | CORRECTIVE ACTION |
|-------|---|
| 1 | Refer to <i>Data Transmission</i> in this chapter to make sure that the user is able to transmit to the AES-100. |
| 2 | Make sure the gateway' s IP address is the same as the one configured in the user' s computer. |
| 3 | Check the VLAN configuration of the Ethernet port on the AES-100 (refer to the <i>Bridge Configuration</i> chapter). |
| 4 | Check the Ethernet cable and connections between the AES-100 and the gateway. |
| 5 | Try to access another remote server. If data can be transmitted to a different remote server, the remote server that could not be accessed may have a problem. |

11.8 SNMP

The SNMP manager server can not get information from the AES-100.

Table 11-8 Troubleshooting the SNMP Server

| STEPS | CORRECTIVE ACTION |
|-------|--|
| 1 | Ping the SNMP server from the AES-100. If you cannot, change the cable or IP configuration (see the <i>IP Configuration</i> chapter). |
| 2 | Check to see that the community (or trusted host) in the AES-100 matches the SNMP server' s community. If these steps fail to correct the problem, contact the distributor. |

11.9 Telnet

I can not telnet into the AES-100.

Table 11-9 Troubleshooting Telnet

| STEPS | CORRECTIVE ACTION |
|-------|---|
| 1 | Make sure that a telnet session is not already operating. The AES-100 will only accept one telnet session at a time. |
| 2 | <p>Ping the AES-100 from your computer.</p> <p>If you are able to ping the AES-100 but are still unable to telnet, contact the distributor.</p> <p>If you cannot ping the AES-100, check the IP addresses in the AES-100 and your computer. Make sure that both IP addresses are located in the same subnet (refer to the <i>Setting IP Address</i> section of this User' s Guide).</p> |
| 3 | If you are attempting to telnet from the ADSL side of the AES-100, refer to <i>Data Transmission</i> in this chapter to make sure that you can transmit data to the AES-100. |
| 4 | If you are attempting to telnet from the Ethernet side of the AES-100, check the Ethernet cable. |
| 5 | <p>Make sure that the device type of the AES-100' s IP address is set to bridge (refer to the <i>Setting IP Address</i> section).</p> <p>If these steps fail to correct the problem, contact the distributor.</p> |

Index

A

| | |
|---------------------------|--------------------|
| AC INPUT | 2-4 |
| Access Flush Command..... | 8-3 |
| Access List Command | 8-3 |
| Actual Speed | 4-1 |
| ADSL Configuration | 4-1 |
| ADSL standards | 4-1, 5-1, 6-2, 6-3 |
| AES -100 | xi |
| Aggregates traffic..... | 1-3 |
| airflow | 2-4 |
| auto | 4-6, 4-7 |

B

| | |
|----------------------------|-----|
| Bridge Configuration | 6-1 |
| Bridge Port Numbers | 6-1 |

C

| | |
|------------------------------|-------------------------|
| CE Certification | iv |
| certification..... | iv |
| chan nel attenuation | 4-5 |
| Chassis | 1-1 |
| CI Commands | 3-1 |
| CO port..... | 2-3 |
| Command Line Interface | 3-1 |
| Command Structure..... | 3-1 |
| community | 8-2 |
| Config Command..... | 7-2 |
| Config Print Command | 3-3 |
| Config Save Command | 3-3, 4-2, 6-1, 6-2, 6-3 |
| Configuration | |
| Backing up | 9-1, 9-2, 10-1, 10-5 |
| Restoring..... | 9-2 |

Connections

| | |
|-----------------------------------|-----|
| ADSL Port | 2-3 |
| Contacting Customer Support | v |
| Copyright | ii |
| Customer Support | v |

D

| | |
|--------------------------------|--------------------|
| Declaration of Conformity..... | iv |
| default IP address | 7-2 |
| default route..... | 7-1 |
| Disable Port Command..... | 4-2, 5-1, 6-2, 6-3 |
| Disable Ports Command..... | 4-2 |
| Disclaimer | ii |
| Downstream (ds)..... | 4-5 |

E

| | |
|----------------------------------|-----|
| Enable Port Command..... | 4-2 |
| Enable Ports Command..... | 4-3 |
| Ethernet Port Configuration..... | 5-1 |
| Exit Command | 3-3 |

F

| | |
|---|------|
| FCC..... | iv |
| FCC Rules | iv |
| Federal Communications Commission (FCC) | |
| Interference Statement | iv |
| Firmware Update..... | 10-1 |
| Front Panel..... | 2-1 |
| Front Panel Indicators..... | 2-2 |
| Front Panel Ports | 2-2 |

G

| | |
|--------------|-------------------------|
| G.dmt | 4-1, 5-1, 6-1 |
| G.lite | 4-1, 4-6, 4-7, 5-1, 6-1 |
| gdmt | 4-6, 4-7 |

| | |
|---|----------------------------|
| General IP Commands | 7-2, 9-1, 9-2, 10-1, 10-5 |
| GetNext | 8-2, 8-3 |
| glite | 4-6, 4-7 |
| H | |
| Help Facility | 3-2 |
| I | |
| interleave delay | 4-4 |
| IP Configuration | 7-1 |
| L | |
| line bit allocation | 4-3 |
| line operating values | 4-3 |
| line performance counters | 4-4 |
| line rate parameters | 4-5 |
| Linedata Command | 4-3 |
| Lineinfo Command | 4-3 |
| Lineperf Command | 4-4 |
| Linerate Command | 4-5 |
| List Port Command | 4-6 |
| List Ports Command | 4-6 |
| M | |
| Management Information Base (MIB) | 8-2 |
| margins | 4-5 |
| maximum attainable rate | 4-5 |
| MDF (Main Distribution Frame) | 2-4 |
| MTU | 1-3 |
| Multiplexer | 1-1 |
| N | |
| Network Interface Card | 2-1 |
| NIC | See Network Interface Card |
| O | |
| Operational mode | 4-6, 4-7 |

P

| | |
|---------------------------------|-----|
| parity byte assignment | 4-4 |
| parity bytes per codeword | 4-4 |
| Passwd Command | 3-2 |
| Password | 8-2 |
| Ping Command | 7-2 |
| Port-Based VLAN | 6-1 |

R

| | |
|-----------------------------|-----|
| Rear Panel | 2-3 |
| Rear Panel Connections | |
| Connections | 2-4 |
| Rear Panel | 2-3 |
| Related Documentation | xi |
| Remote Management | 8-1 |
| repair | iii |
| Restart Command | 3-2 |

S

| | |
|------------------------------|---------------|
| Service | iii |
| Services | v |
| Set | 8-2, 8-3, 8-4 |
| Set Port Command | 4-6 |
| Setting IP address | 7-1 |
| Show Port Command | 4-7 |
| Show Ports Command | 4-7 |
| SHOWTIME | 4-5 |
| SNMP | 8-1, 8-2, 8-3 |
| Get | 8-2, 8-3 |
| Manager | 8-2 |
| Trap | 8-2 |
| Software Configuration | 3-1 |
| Splitters | |
| Integrated Splitters | 1-1 |

| | | | |
|---------------------------|------------|------------------------------|----------|
| Statistics Command | 7-2 | upstream (us) | 4-5 |
| Syntax Conventions | xi | Uptime Command | 3-2 |
| System Commands | 3-2 | USER port | 2-3 |
| T | | V | |
| Telnet | 8-1 | Vendor ID | 4-4 |
| Terminal Emulation | 2-1, 3-1 | Version Command | 3-2, 7-3 |
| TFTP | 10-1, 10-5 | Version Number | 4-4 |
| TFTP | 9-1 | VLAN | 6-1 |
| Trap Add Command | 8-3, 8-4 | VT100 | 2-1, 3-1 |
| Trap Configuration | 8-3 | W | |
| Trap Delete Command | 8-4 | Warning Sticker | 2-4 |
| Trap Flush Command | 8-4 | Warranty | iii |
| Trap List Command | 8-4 | Z | |
| U | | ZyXEL Limited Warranty | iii |
| Unpacking | 2-1 | Note | iii |